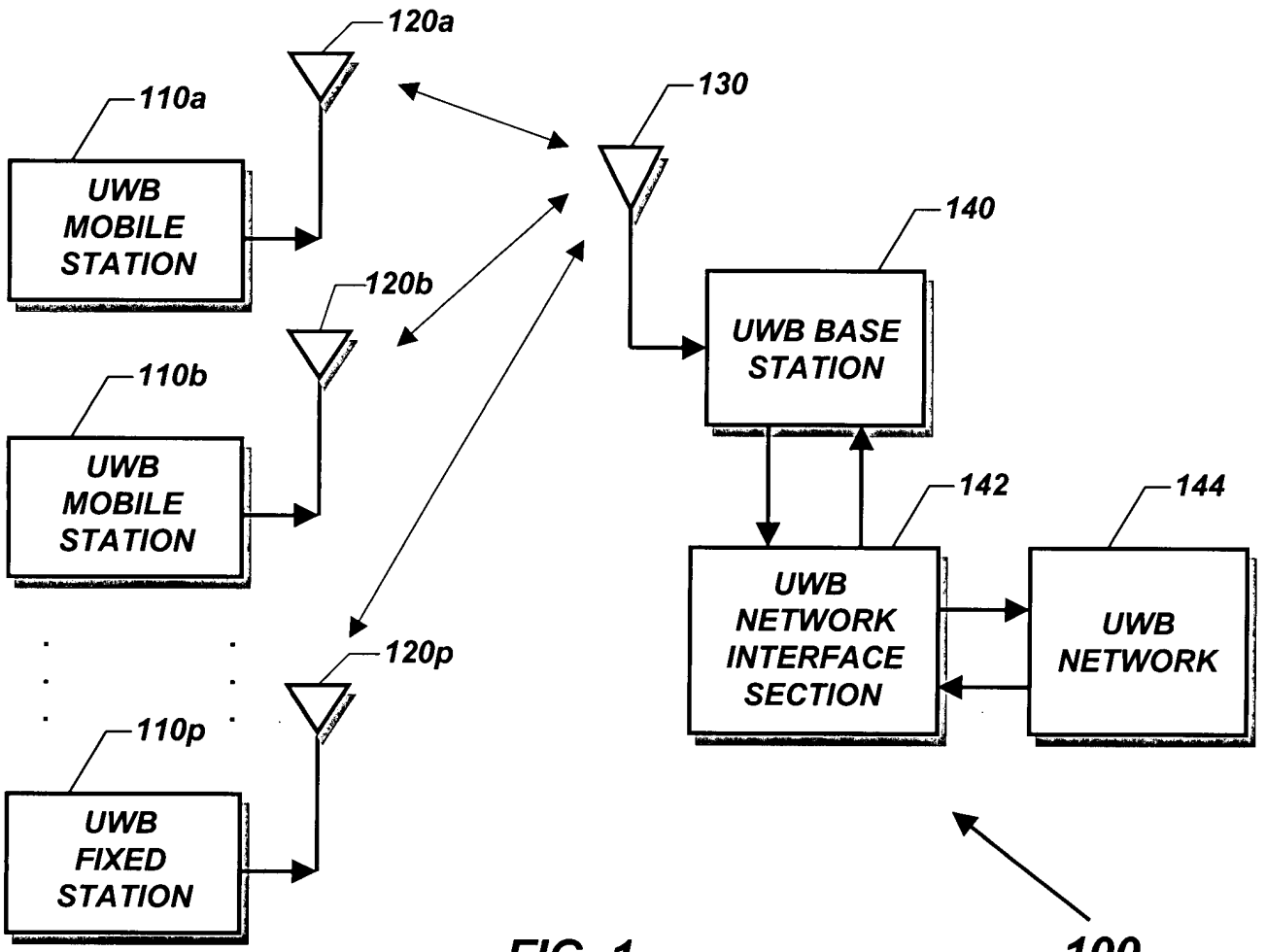

120a
110a
UWB
MOBILE
STATION
130
140
120b
UWB BASE
STATION
110b
UWB
MOBILE
STATION
142
144
UWB
NETWORK
INTERFACE
SECTION
UWB
NETWORK
120p
110p
UWB
FIXED
STATION
100

FIG. 1

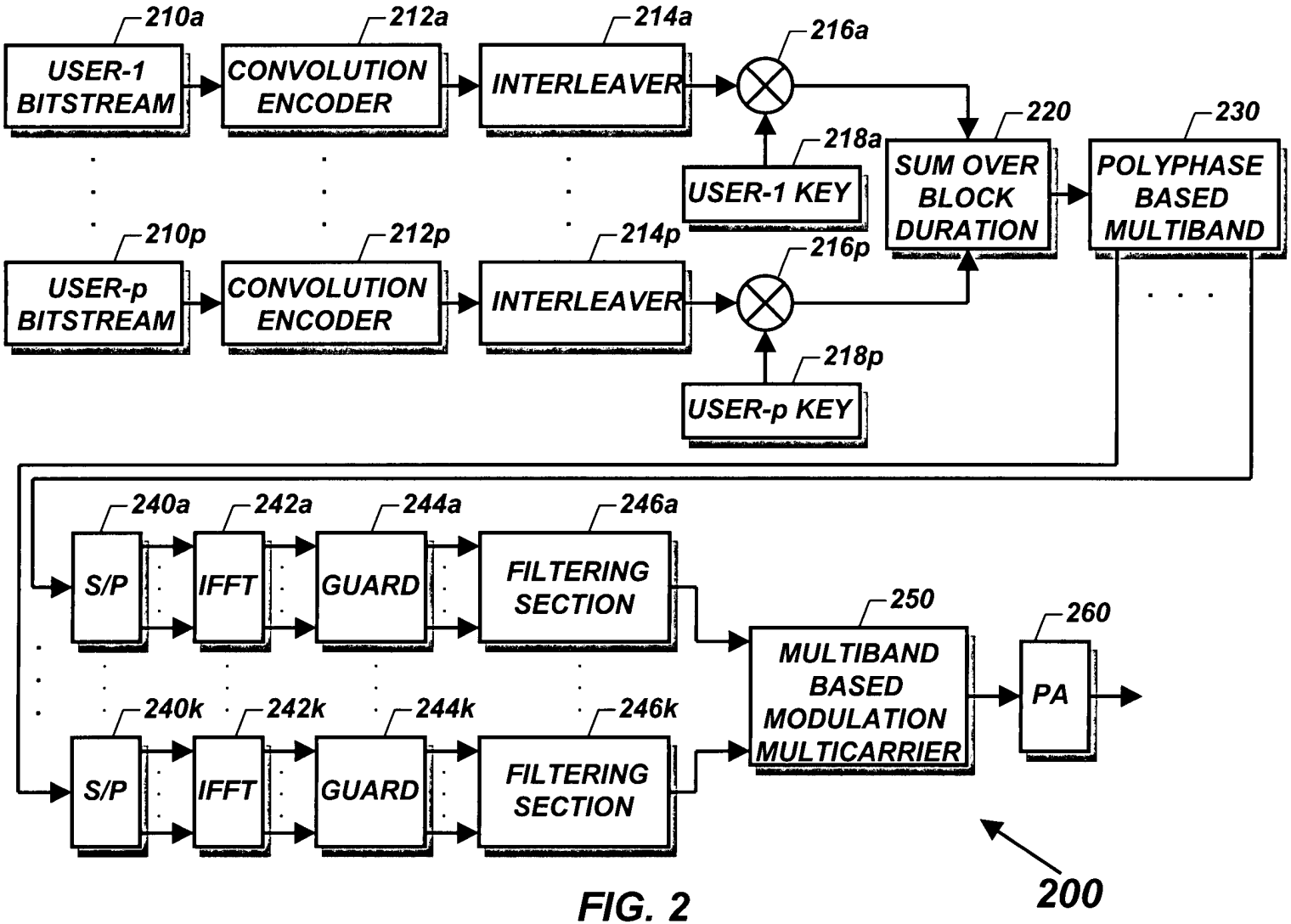

210a
USER-1 BITSTREAM
212a
CONVOLUTION ENCODER
214a
INTERLEAVER
216a
218a
USER-1 KEY
220
SUM OVER BLOCK DURATION
230
POLYPHASE BASED MULTIBAND
210p
USER-p BITSTREAM
212p
CONVOLUTION ENCODER
214p
INTERLEAVER
216p
218p
USER-p KEY
240a
S/P
242a
IFFT
244a
GUARD
246a
FILTERING SECTION
240k
S/P
242k
IFFT
244k
GUARD
246k
FILTERING SECTION
250
MULTIBAND BASED MODULATION MULTICARRIER
260
PA
200

FIG. 2

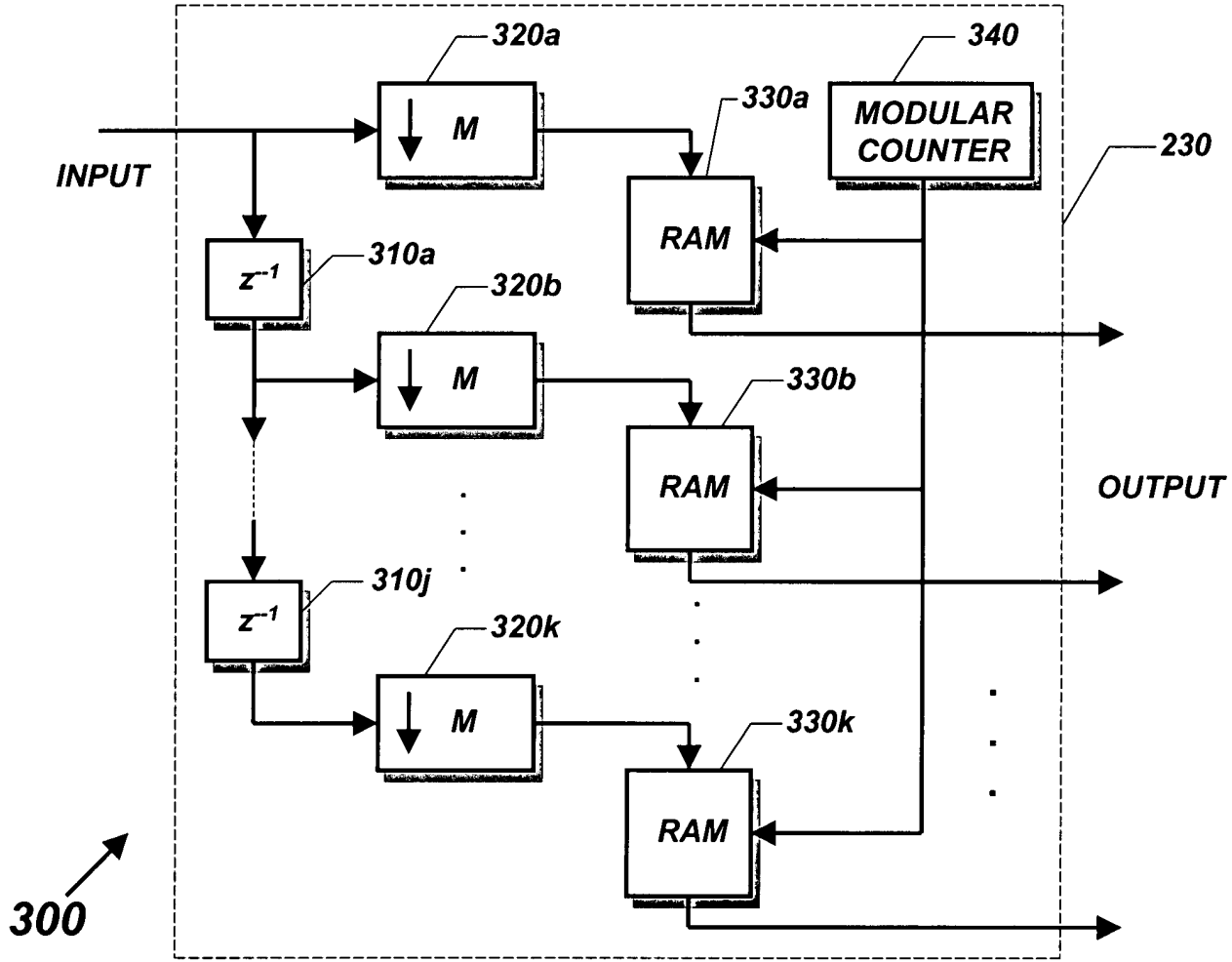

320a
340
330a
MODULAR COUNTER
230
INPUT
M
RAM
310a
z^{-1}
320b
M
330b
RAM
OUTPUT
310j
z^{-1}
320k
M
330k
RAM
300

FIG. 3

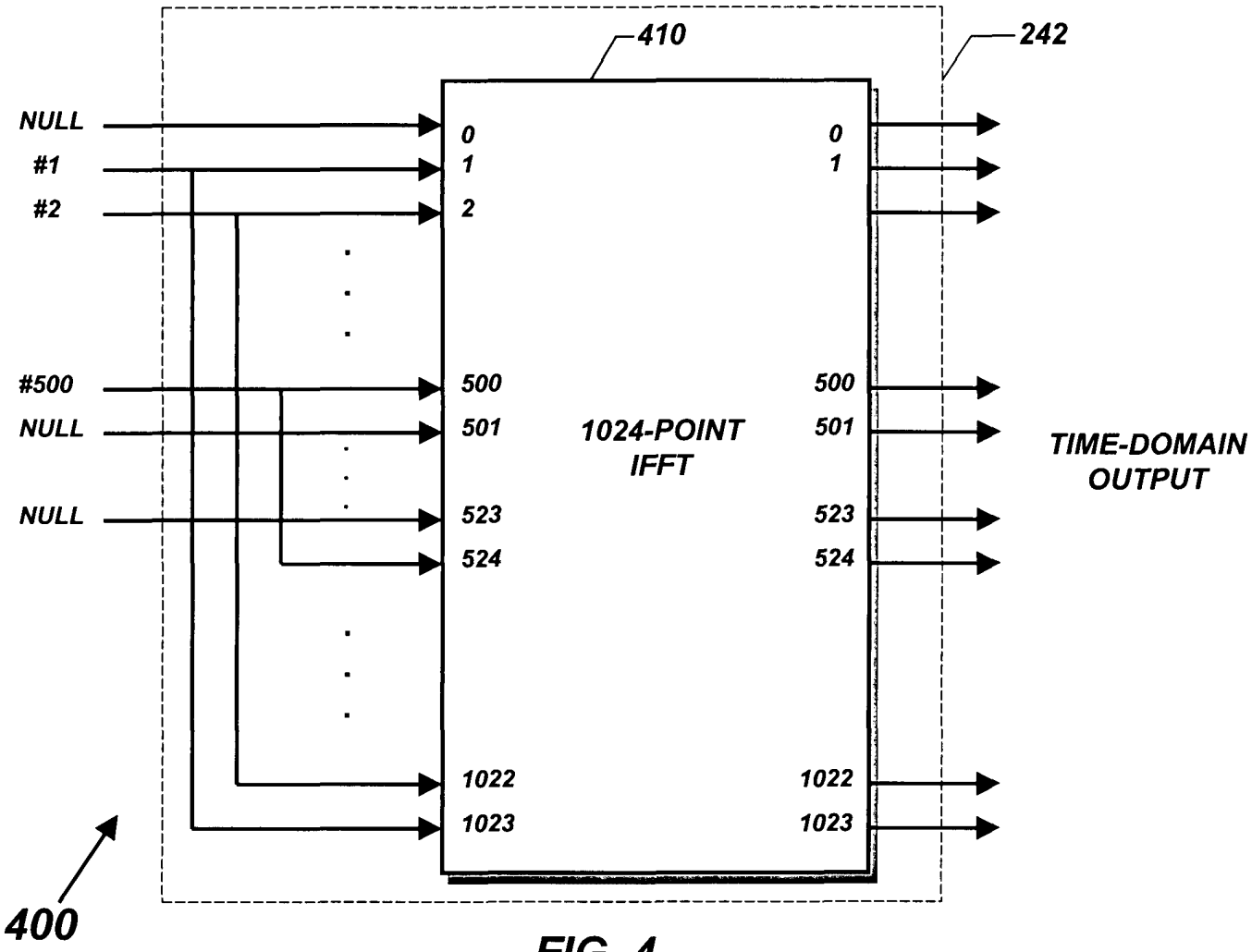

410
242
NULL
#1
#2
#500
NULL
NULL
0
1
2
500
501
523
524
1022
1023
1024-POINT
IFFT
0
1
500
501
523
524
1022
1023
TIME-DOMAIN
OUTPUT
400

FIG. 4

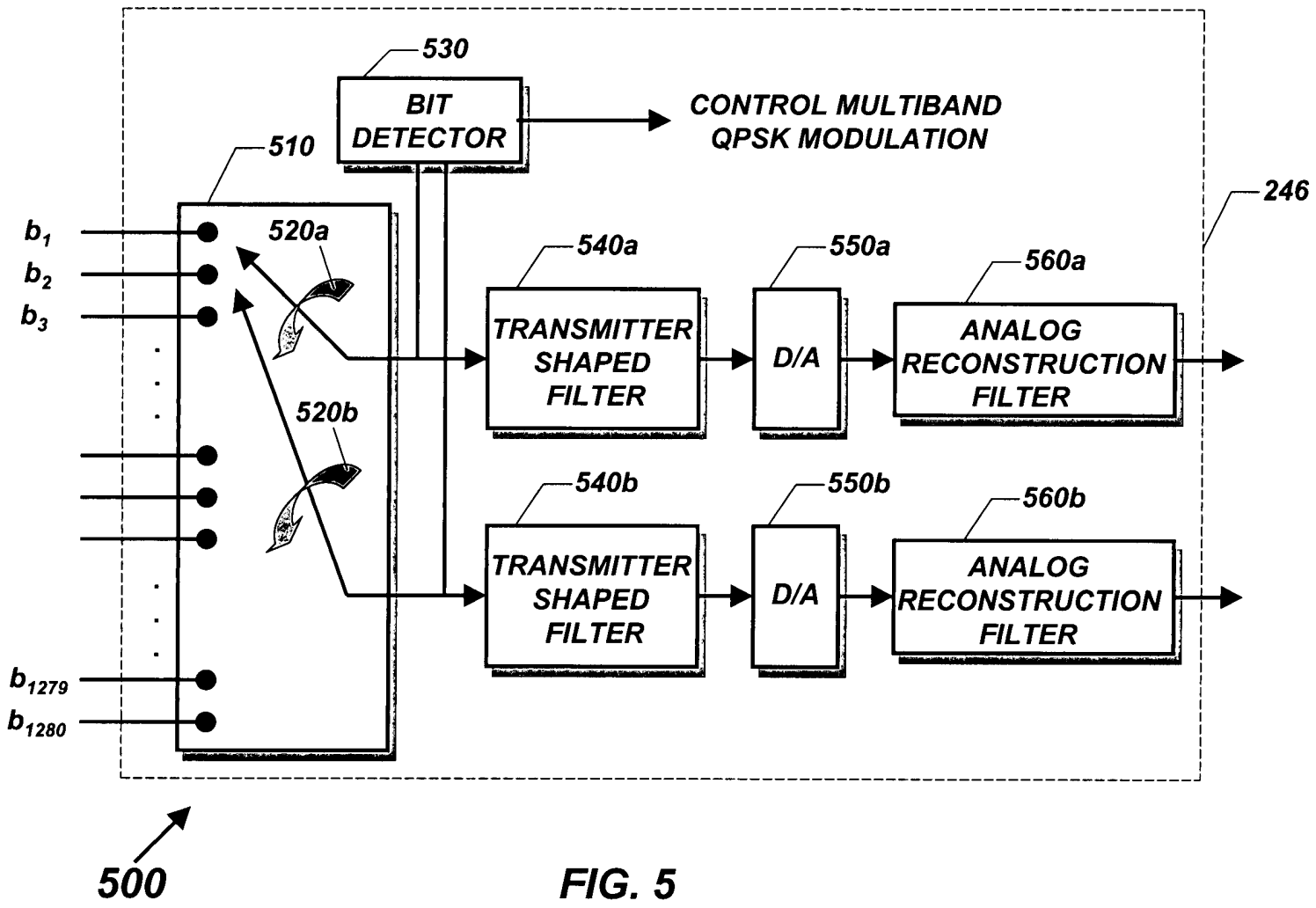

530
BIT DETECTOR
CONTROL MULTIBAND QPSK MODULATION
510
246
b_1
b_2
b_3
520a
520b
540a
550a
560a
TRANSMITTER SHAPED FILTER
D/A
ANALOG RECONSTRUCTION FILTER
540b
550b
560b
TRANSMITTER SHAPED FILTER
D/A
ANALOG RECONSTRUCTION FILTER
b_{1279}
b_{1280}
500

FIG. 5

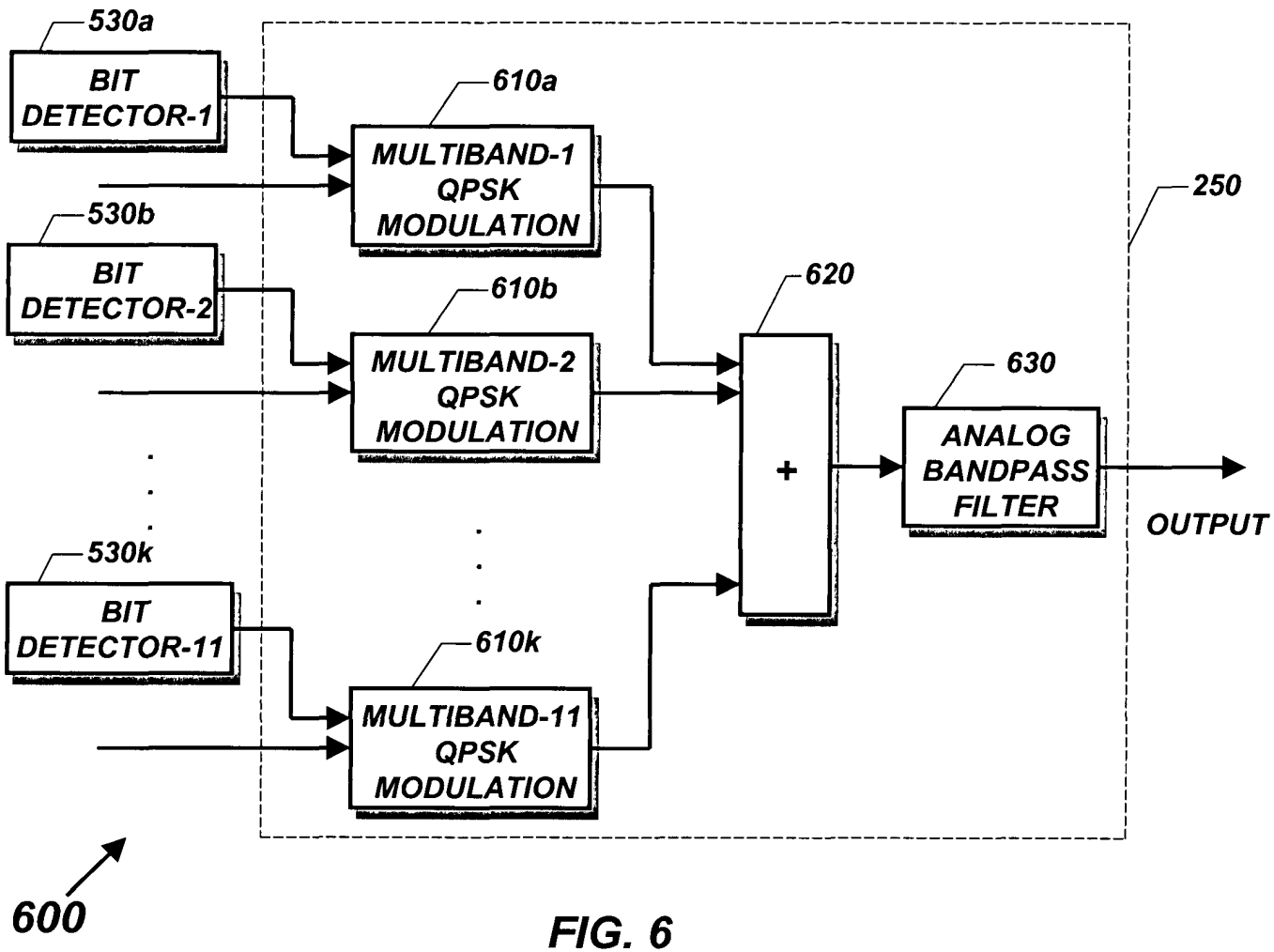

530a
BIT DETECTOR-1
530b
BIT DETECTOR-2
530k
BIT DETECTOR-11
610a
MULTIBAND-1 QPSK MODULATION
610b
MULTIBAND-2 QPSK MODULATION
610k
MULTIBAND-11 QPSK MODULATION
620
+
630
ANALOG BANDPASS FILTER
OUTPUT
250
600

FIG. 6

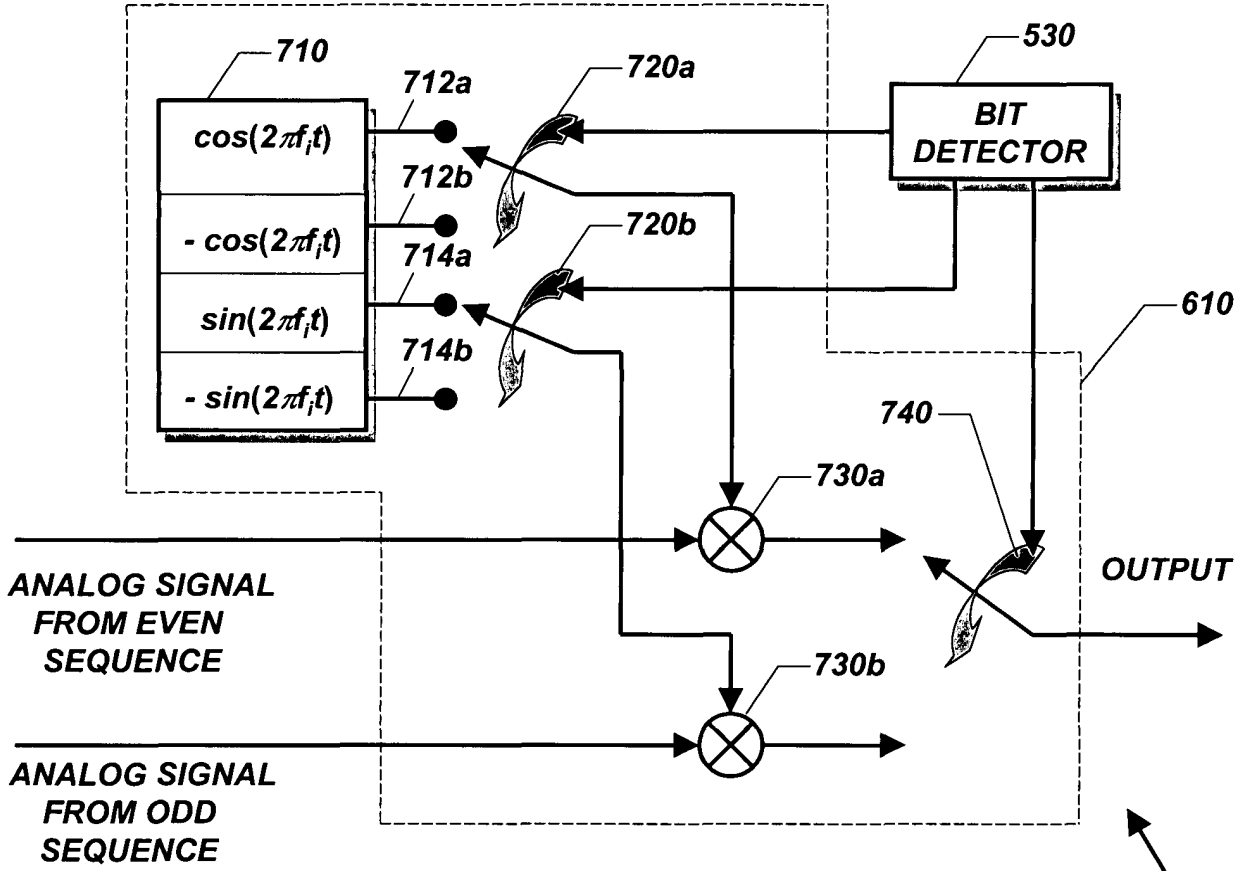
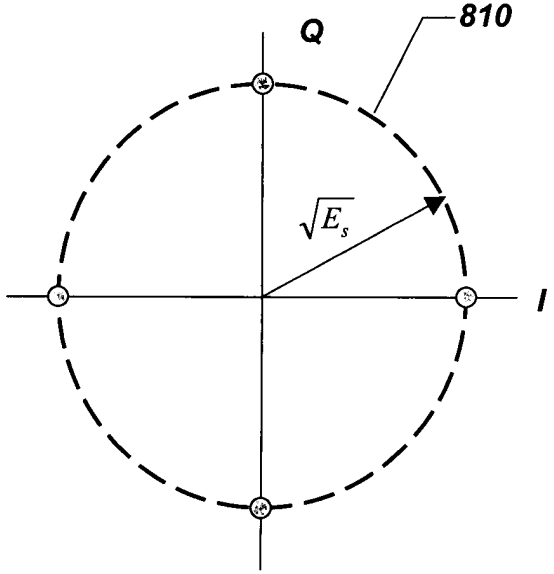

710
712a
720a
530
BIT DETECTOR
cos(2πf_it)
712b
- cos(2πf_it)
720b
714a
sin(2πf_it)
610
714b
- sin(2πf_it)
740
730a
ANALOG SIGNAL FROM EVEN SEQUENCE
OUTPUT
730b
ANALOG SIGNAL FROM ODD SEQUENCE
700

FIG. 7



820

BIT PATTERN	PHASE
00	0
01	$\pi/2$
10	π
11	$3\pi/2$

800

FIG. 8

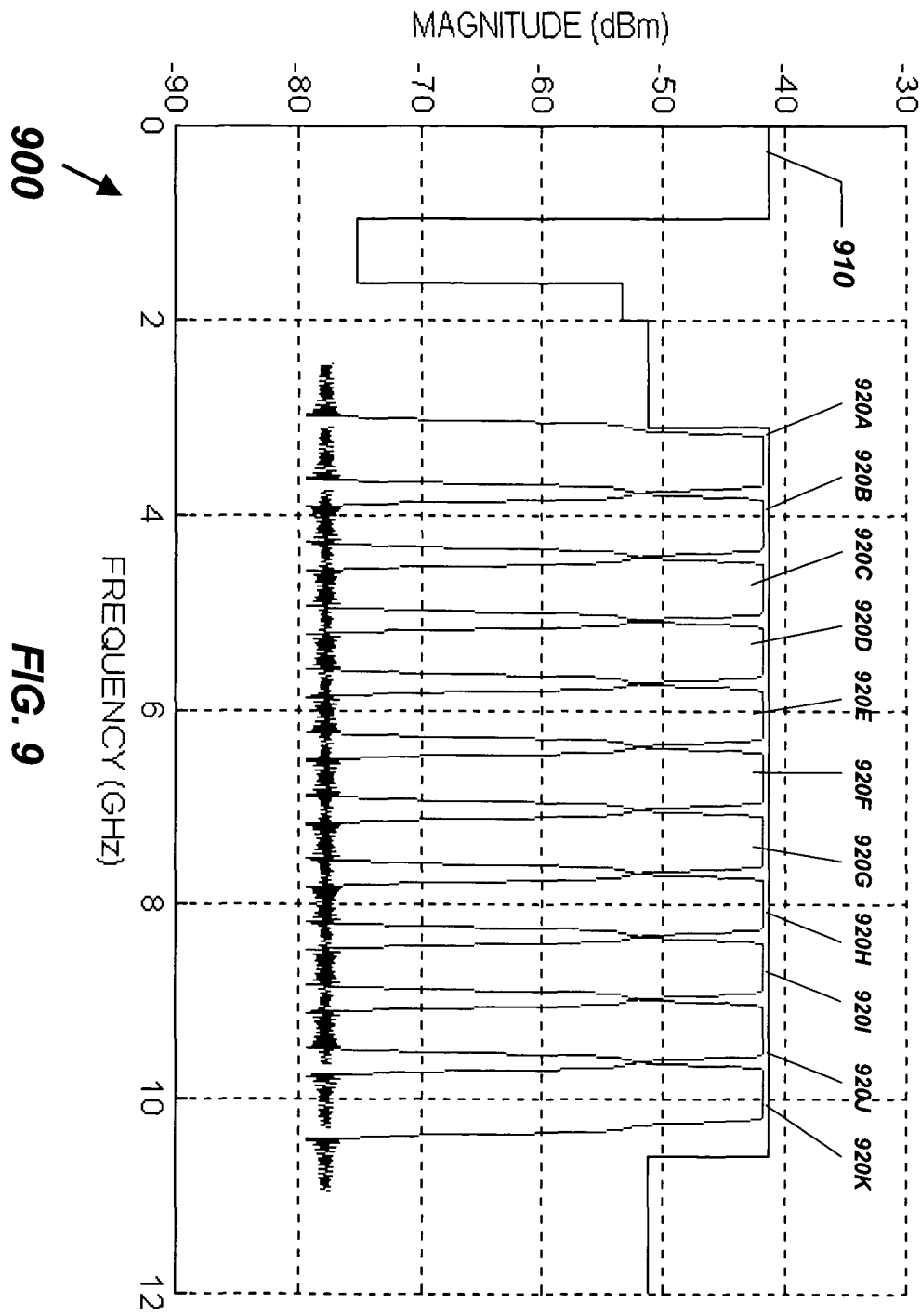

MAGNITUDE (dBm)
-30
-40
-50
-60
-70
-80
-90
0
2
4
6
8
10
12
FREQUENCY (GHz)
910
920A
920B
920C
920D
920E
920F
920G
920H
920I
920J
920K
900

FIG. 9

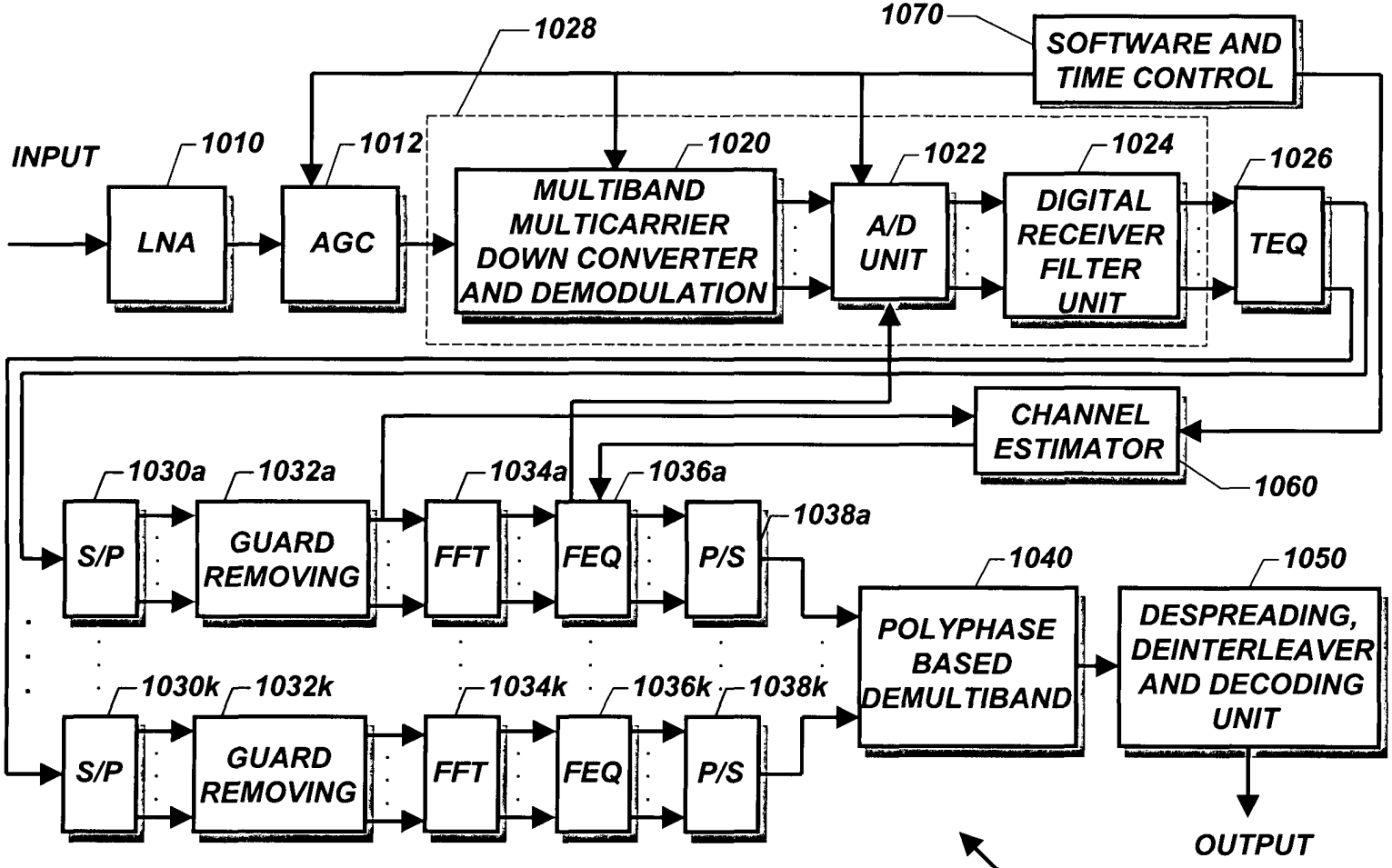

1070
SOFTWARE AND TIME CONTROL
1028
INPUT
1010
LNA
1012
AGC
1020
MULTIBAND MULTICARRIER DOWN CONVERTER AND DEMODULATION
1022
A/D UNIT
1024
DIGITAL RECEIVER FILTER UNIT
1026
TEQ
CHANNEL ESTIMATOR
1060
1030a
S/P
1032a
GUARD REMOVING
1034a
FFT
1036a
FEQ
P/S
1038a
1040
POLYPHASE BASED DEMULTIBAND
1050
DESPREADING, DEINTERLEAVER AND DECODING UNIT
OUTPUT
1030k
S/P
1032k
GUARD REMOVING
1034k
FFT
1036k
FEQ
P/S
1038k

FIG. 10

1000

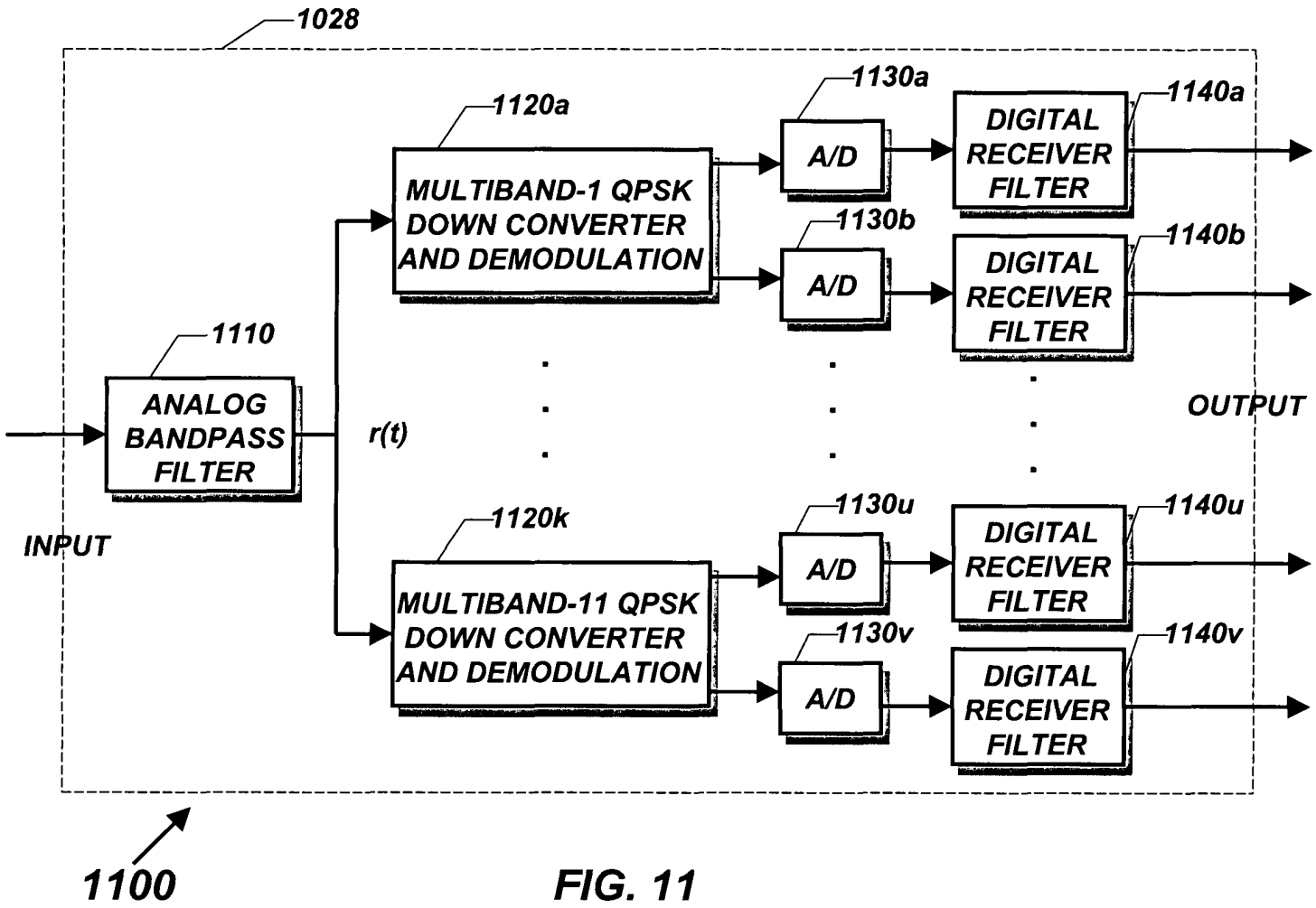

1028
1130a
1120a
1140a
DIGITAL RECEIVER FILTER
A/D
MULTIBAND-1 QPSK DOWN CONVERTER AND DEMODULATION
1130b
1140b
1110
ANALOG BANDPASS FILTER
r(t)
OUTPUT
INPUT
1120k
1130u
1140u
MULTIBAND-11 QPSK DOWN CONVERTER AND DEMODULATION
1130v
1140v
1100

FIG. 11

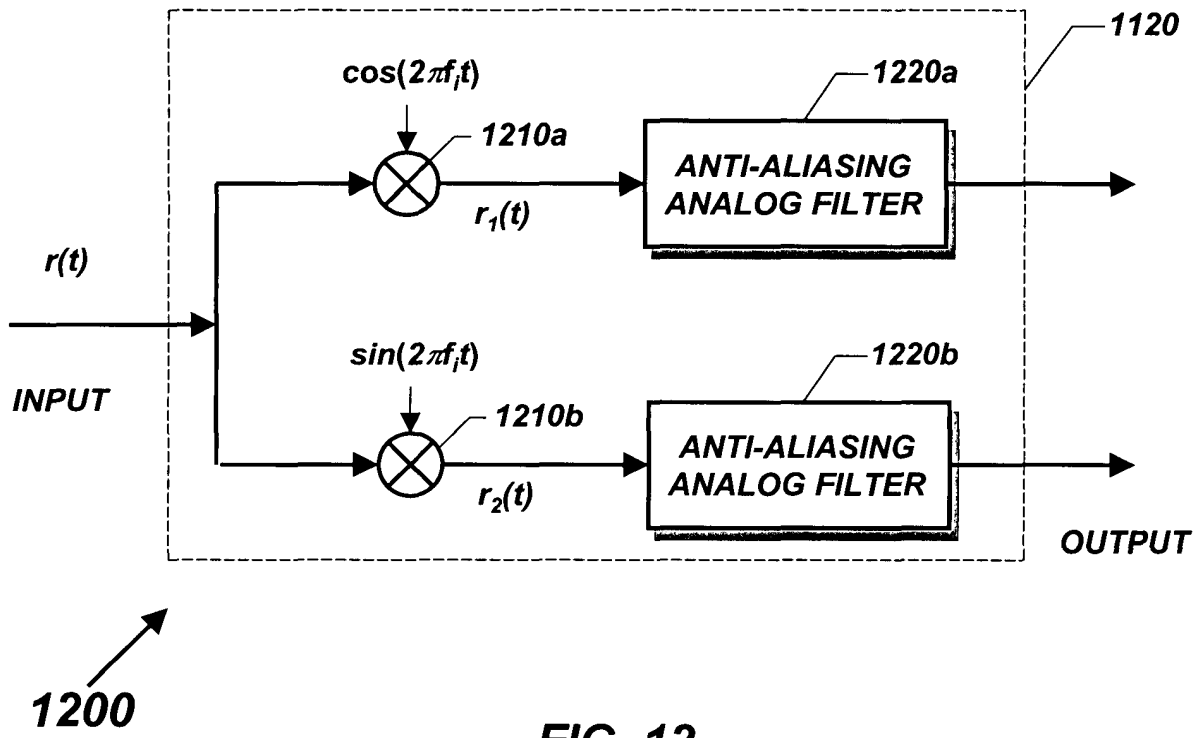
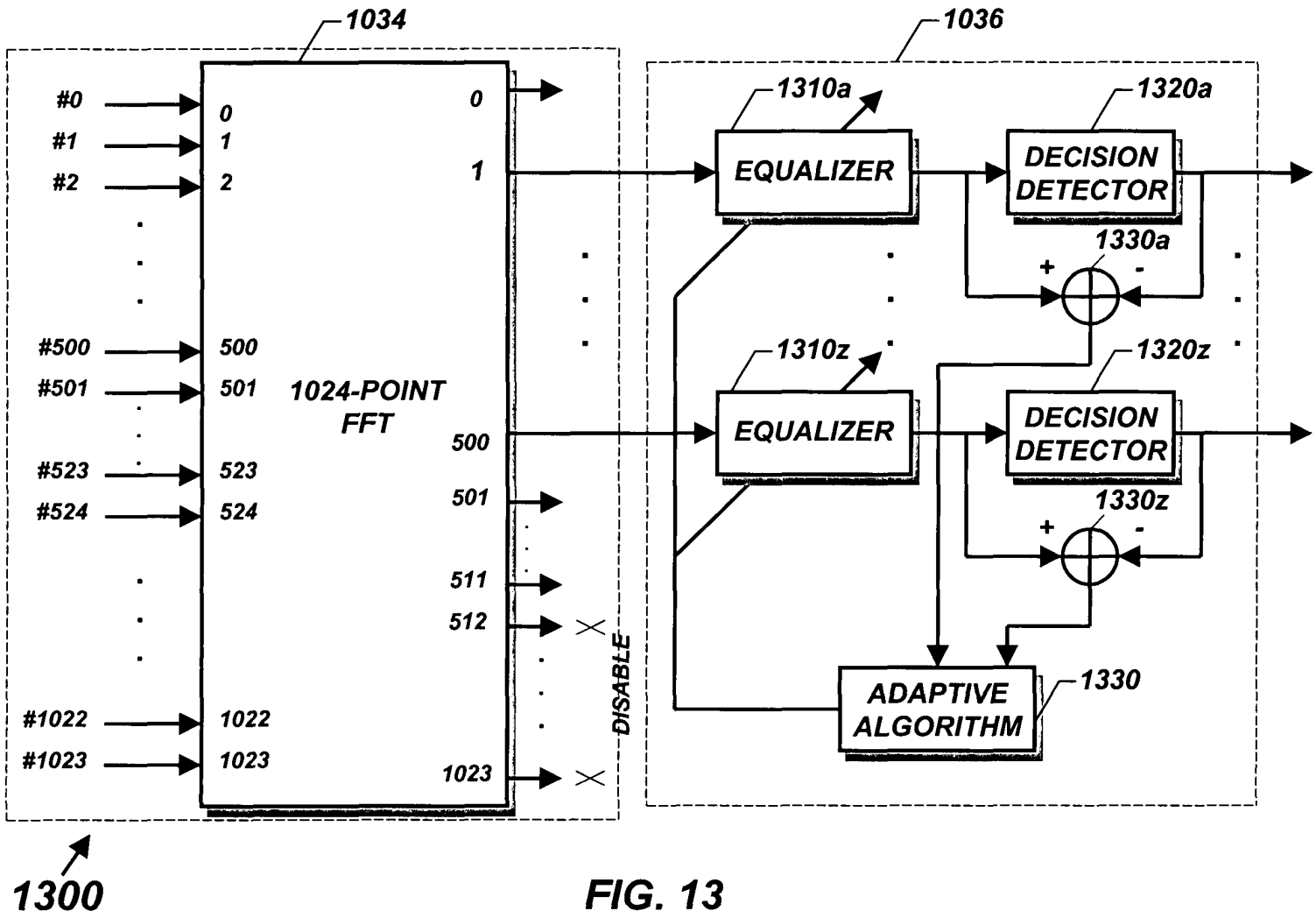

1120
cos(2πf_i t)
1220a
1210a
ANTI-ALIASING ANALOG FILTER
r_1(t)
r(t)
INPUT
sin(2πf_i t)
1220b
1210b
ANTI-ALIASING ANALOG FILTER
r_2(t)
OUTPUT
1200

FIG. 12


1034
1036
#0
#1
#2
#500
#501
#523
#524
#1022
#1023
0
1
2
500
501
523
524
1022
1023
1024-POINT FFT
0
1
500
501
511
512
1023
DISABLE
1310a
EQUALIZER
1320a
DECISION DETECTOR
1330a
+
-
1310z
EQUALIZER
1320z
DECISION DETECTOR
1330z
+
-
ADAPTIVE ALGORITHM
1330

1300

FIG. 13

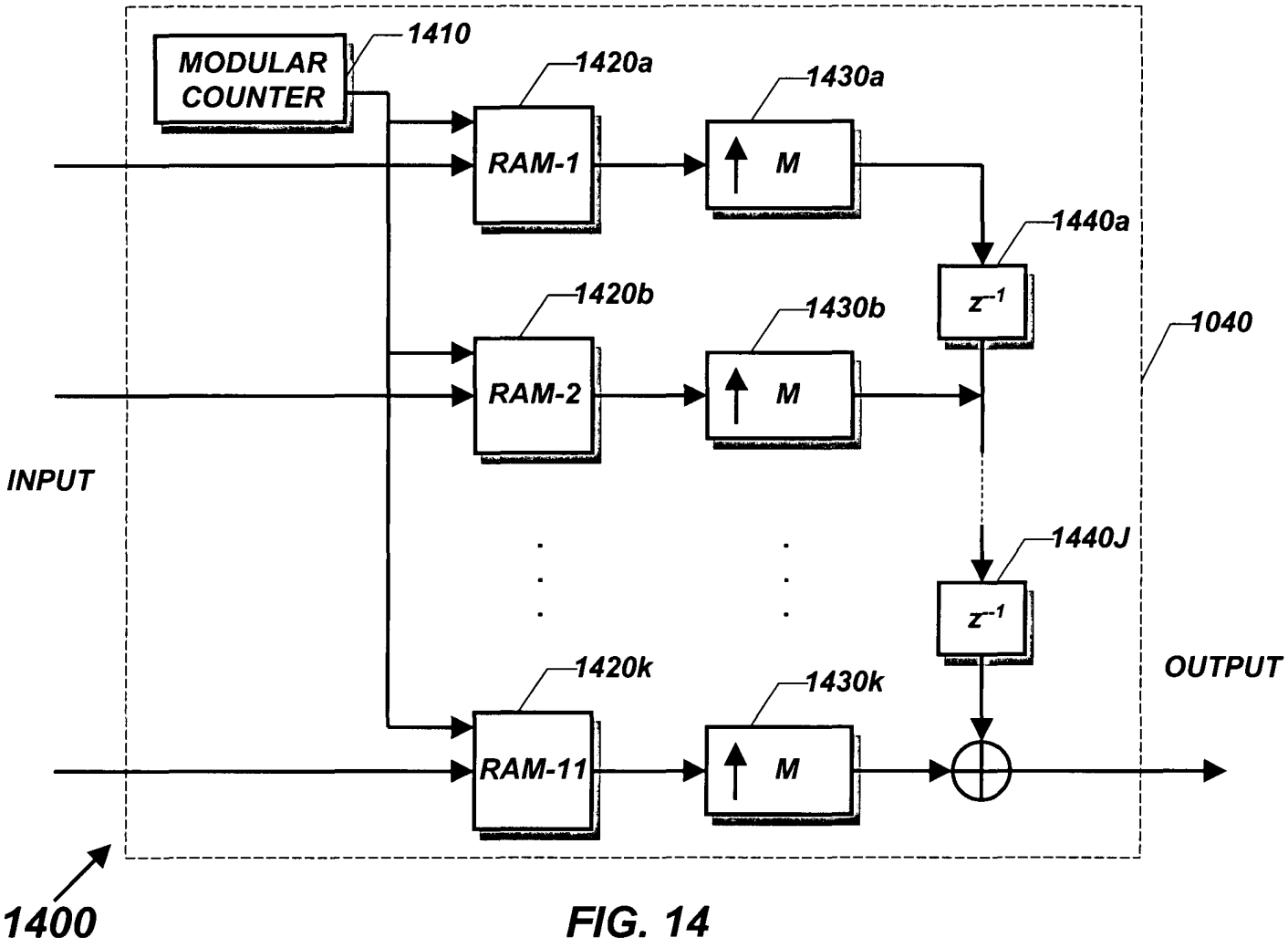

MODULAR COUNTER
1410
1420a
RAM-1
1430a
M
1440a
z^{-1}
1420b
RAM-2
1430b
M
1040
INPUT
1440J
z^{-1}
1420k
RAM-11
1430k
M
OUTPUT
1400

FIG. 14

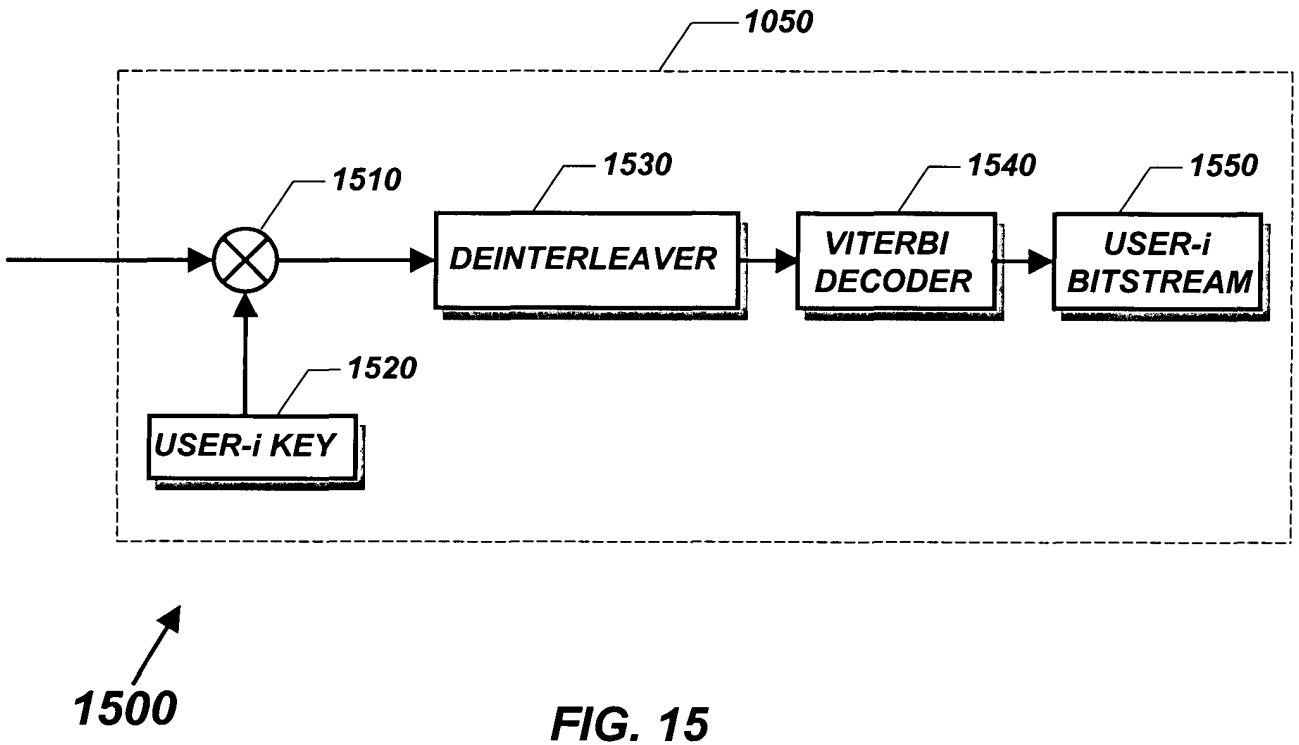

1050
1510
1530
1540
1550
DEINTERLEAVER
VITERBI DECODER
USER-i BITSTREAM
1520
USER-i KEY
1500

FIG. 15